carbon-exposed sonicated dextrose albumin (PESDA) can produce bright transient myocardial echocardiographic contrast (MC) when ultrasound transmission is briefly interrupted (transient response imaging (TRI)) following IV injection, especially when using a second harmonic (SH) receiving frequency. It is unknown, however, whether MC could be produced with TRI in humans. Accordingly, in 15 patients with normal resting wall motion, the MC produced by TRI using SH imaging (2–2.5 MHz fundamental, 4.0–5.0 MHz received frequency) was compared with conventional SH imaging using 30 Hertz frame rates (CI) following 0.0025–0.01 ml/kg IV injections of PESDA. An example is shown:

There were no side effects following any IV injection. Peak anterior *and posterior* MC was significantly greater with TRI (37 ± 20 TRI vs. 18 ± 14 CI anterior; 17 ± 14 TRI vs. 5 ± 5 CI posterior; $p < 0.02$). Visually evident anterior MC was observed in 13 of 14 patients with TRI compared to seven patients with CI, and posterior contrast was visualized in nine with TRI compared to one with CI. Second harmonic TRI will significantly enhance the ability of IV PESDA to produce myocardial contrast in humans.

11:30

787-5 Improved Myocardial Contrast Visualization With Tissue Doppler Imaging During Peripheral and Intracoronary Injection of Albunex®

Nelson P. Trujillo, Roger D. Bies, Douglas A. Morrison, Mark W. Keller. *University of Colorado HSC, Denver, Colorado; DVAMC, Denver, Colorado*

Tissue Doppler imaging (TDI®) encodes myocardial velocity and power. We investigated the use of Albunex® given IV or intracoronary to strengthen the TDI® Doppler signal and enhance myocardial contrast in 7 pts. Nineteen intracoronary injections (dose: 1–3 ml) were performed. Peripheral injections (n = 15, dose: 10–30 ml) were made through an 18g IV during pharmacologic stress echo. Black and white (BW) images along with color encoded TDI® in the power mode were recorded at baseline and following each Albunex® injection. Digital and analog analysis was performed on 191 cardiac segments at end-diastole. Results: Background subtracted video intensity of intracoronary injections was enhanced with TDI® compared to BW (25 ± 12 for TDI® vs. 13 ± 5 for BW, $p < 0.008$). Video intensity was also enhanced during the peripheral injection of Albunex® (23 ± 12 for TDI® vs. 11 ± 8 for BW, $p < 0.003$). Analog interpretation of TDI® was improved after intracoronary injection, but not during peripheral injections. LV opacification also was enhanced on TDI® after peripheral injections.

Parasternal long axis view showing contrast enhancement of the posterior wall and papillary muscle.

Conclusion: TDI® coupled with Albunex® provides quantitative enhancement of the Doppler signal with improved left ventricular cavity opacification and digital myocardial detection.

11:45

787-6 Regional Left Ventricular Diastolic Dysfunction Evaluated by Tissue Doppler Imaging as an Earlier Signal of Myocardial Ischemia. Experimental Study of Induced Ischemia and Reperfusion in Pigs

Miguel Garcia-Fernandez, José Azevedo, Pablo Puerta, Mar Moreno, Daniel SanRoman, Esteban Torrecilla, Esteban Lopez de Sa, Jose Vallejo, JuanLuis Delcan. *Laboratorio de Ecocardiografia, Servicio de Cardiologia, Hospital General Gregorio Maranõn, Madrid, Espanã*

Ischemia produces significant changes in the left ventricular (LV) wall thickening and velocity of contraction and relaxation of myocardial fibers, leading to regional wall motion abnormalities. The purpose of our experimental study was to evaluate through a new echo technique, pulsed Doppler Tissue Imaging (DTI), the velocities of contraction and relaxation of an ischemic myocardial wall segment under continuous DTI monitoring. We produced ischemia of the distal interventricular septum through banding of the medial segment of the LAD in 8 pigs. In each animal we measured the peak velocity (Vel/cm/sec) and time velocity integral (TVI/cm) of the systolic (S), early (E) and late (A) diastolic velocities of relaxation by pulsed DTI of the ischemic wall segment at baseline conditions, during 5″, 15″ and 30″ after induced ischemia and 5″, 15″ and 30″ post reperfusion. The E/A DTI ratio, the LV pressure and the RR interval were also sequentially calculated.

	Bas	5″	15″	30″	5″post	15″post	30″post
E Vel	13.8 ± 2.8	11.6 ± 2°	10.5 ± 2.3°°	9.8 ± 1.7°	13 ± 3.8	13.3 ± 3.7	13.7 ± 2.8
A Vel	8.3 ± 1.4	8.8 ± 1	9.7 ± 0.9§	10.8 ± 1.9°°	9 ± 1.4	8.4 ± 1.8	7.8 ± 1.1
E/A V	1.6 ± 0.3	1.3 ± 2°	1 ± 0.2°°	0.8 ± 0.1°°	1.5 ± 0.4	1.6 ± 0.4	1.7 ± 0.3
S Vel	5 ± 1.2	4.5 ± 1	3.5 ± 1.7°	2.9 ± 1.3°°	4.8 ± 1.1	5.2 ± 1.3	5.3 ± 1.2

P Val ° < 0.01; °° < 0.001

We conclude that transient ischemia can produce significant and reversible changes in the LV myocardial wall velocities of relaxation. These changes occur immediately after coronary occlusion in the ischemic segment, and are more pronounced for the E wave and the E/A ratio, followed by the systolic and the A diastolic waves. This new echocardiographic method can give an adequate basis to perform an analysis of the LV regional myocardial wall function. Our results could be of interest in the further analysis of coronary interventional procedures and reperfusion techniques in a clinical setting.

788 Viability: Relationship to Results of Revascularization

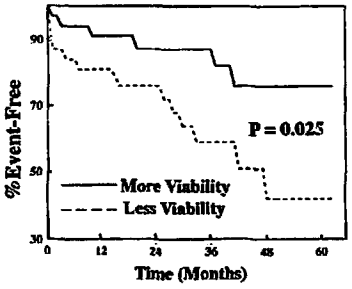
Wednesday, March 27, 1996, 10:30 a.m.–Noon
Orange County Convention Center, Room 224B

10:30

788-1 Long-Term Outcome After Bypass Surgery Is Better in Patients With Ischemic Cardiomyopathy Who Have Viability

Paul R. Pagley, George A. Beller, Denny D. Watson, Lawrence W. Gimple, Michael Ragosta. *University of Virginia, Charlottesville, VA*

Contractile function may improve after coronary bypass surgery (CABG) in patients (pts) with a low ejection fraction (EF) if resting thallium-201 (Tl) imaging demonstrates viability. It is unknown whether pts with low EF and viability have better long-term outcome after CABG compared to pts with low EF and poor viability. Accordingly, we evaluated 73 pts with coronary disease (CAD) and EF of 0.28 ± 0.06 who underwent resting Tl imaging prior to CABG. Segments (n = 15) on Tl images were scored: 2 = normal (> 75% uptake) or total redistribution; 1 = mild (50–75%) defect with or without partial redistribution; and 0 = severe (< 50%) persistent defect. Viability scores were summed and divided by the number of segments visualized to derive a viability index (VI) (median = 0.67). Pts with more viability (VI ≥ 0.67, n = 35) and pts with less viability (VI < 0.67, n = 38) were similar in age, sex, EF and extent of CAD. At follow-up (30 ± 18 months after CABG) there were 21 cardiac events (19 deaths, 2 transplants). Pts with less viability experienced more cardiac events (15/38 vs 6/35; $p = 0.04$). Event-free survival curves are shown:



Thus, pts with CAD, low EF and viability on resting Tl scintigraphy have a better outcome after CABG than pts with less viability.